Everlasting sensor networks

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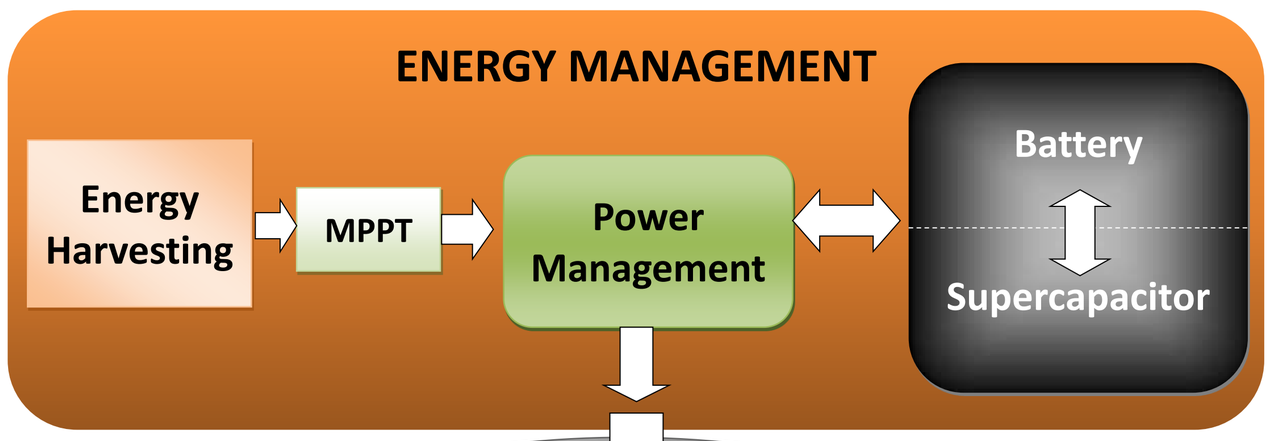
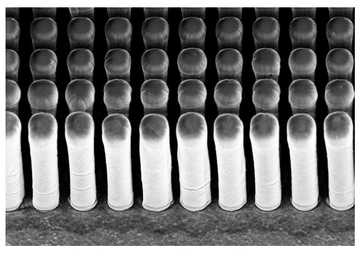
Everlasting sensor networks

Within the team CSAM (Circuits, Systèmes et Applications des Microondes) of IEMN (Institut d'Électronique, de Microélectronique et de Nanotechnologie) and within IRCICA (Institut de Recherche sur les Composants logiciels et matériels pour l'Information et la Communication Avancée - USR CNRS 3080) we develop a research on ultra low power sensor networks. Our goal is to minimize the energy consumption so that the life duration of the network could be infinitely long. We develop studies including nanotechnologies (energy harvesting, storage devices), RF front-ends design, energy management but also radio channel and interference modeling and MAC layer optimization.

Energy Optimization: from the node…





3D Li-ion microbattery

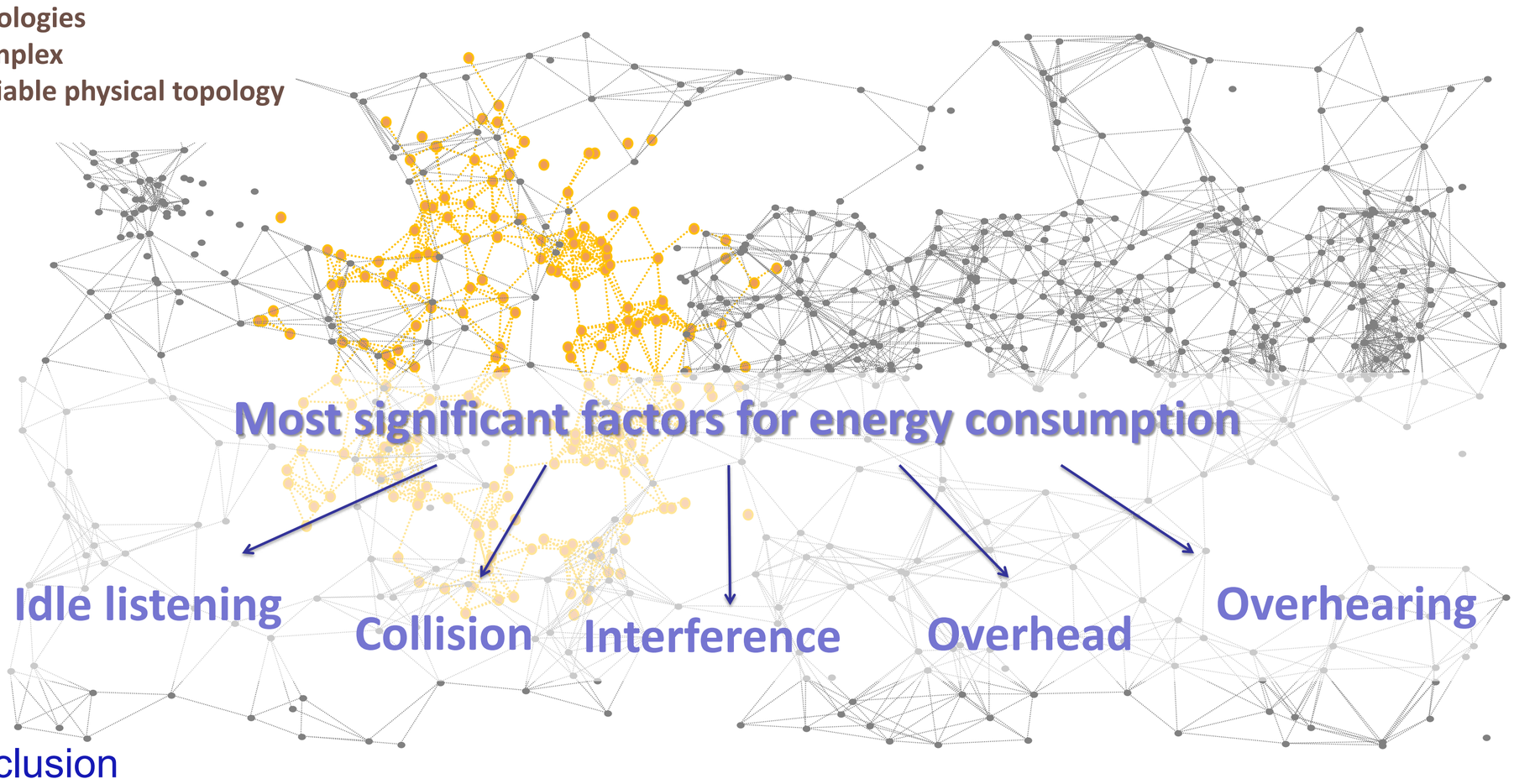
Supercapacitor

Real-Time Energy Consumption Measurement
By component (Hardware) / By function (Software)

- Power Management
- Energy Harvesting
- Renewable Energy
- Maximum Power Point Tracking
- Hybrid System:
  Battery ↑ E ↓ P ↓ Cycles
  Supercapacitor ↓ E ↑ P ↑ Cycles

… to the network

- Large scale
- Different logical topologies
- Complex
- Variable physical topology



Conclusion

Our aim is to create an experimental environment where we can accurately evaluate the energy consumption and optimize at the node level and at the network level the main factors of energy dissipation.

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